A STUDY OF INFERTILITY IN THE COW WITH PARTICULAR REFERENCE TO CAUSE AND TREATMENT

BY

HARRY HARDENBROOK, JR.

D.V.M., Colorado State College of Agriculture and Mechanic Arts, 1940
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IN THE GRADUATE COLLEGE OF THE
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A STUDY OF INFERTILITY IN THE COW WITH PARTICULAR REFERENCE TO CAUSE AND TREATMENT

Infertility and sterility are synonymous terms and are a manifestation of some underlying reproductive derangement. Infertility has been defined as a temporary or permanent inability to reproduce living young and may be absolute or relative in degree.

Infertility causes direct economic losses through increased feeding and management expense and indirect losses through a decreased annual income. In addition, failure to reproduce may threaten a particular family line of animals with extinction.

Data collected from various sources show that about 80 per cent of the females in the breeding herds reproduced each year and that failure of reproduction is recognized as a serious problem in many parts of the world.

The objectives of the present study have been to determine the major pathological causes of infertility in a random group of cattle and to determine whether treatments by uterine injection of 4% Lugol's solution were of value in certain conditions associated with infertility.

Two hundred and forty-three cows that were believed to be infertile and 25 cows with clinically normal reproductive tracts were examined. Uterine biopsy specimens were collected from 169 of these animals. The infertile animals were members of 77 herds ranging in size from one cow to approximately 250 breeding females. Their feeding and management practices were diverse. Breeding was either by natural service or by artificial insemination. So far as was known, brucellosis, vibriosis and trichomoniasis were not problems in any herd in which this study was conducted.

The results of this study were as follows: the incidence of

infertility in these 77 herds was 16.1 per cent. Physical examinations revealed that 125 (51.5%) of the 243 animals with a history of infertility had a significant metritis. Seventy-seven (31.5%) of the animals studied had a demonstrable cervicitis. Nineteen (7.8%) of the animals were considered to be infertile because of endocrine dysfunctions, and five (2.0%) animals were found to have serious congenital defects of the reproductive tract. Vulvitis was present in one (0.4%) cow. Vaginitis was found in 3 (1.2%) cows and chronic salpingitis was palpable in 8 (3.1%) of the 243 animals in this series. Inanition was considered to be the cause of infertility in 1 (0.4%) of these animals. Four (1.7%) of the animals considered infertile by their owners were found to be pregnant.

Uterine biopsy specimens from sixty (80%) of 75 cows with metritis were bacteriologically positive, as were seven (22.6%) of 31 cattle with cervicitis. When cervicitis and metritis were both present, 18 (90%) of the 20 affected animals gave bacteriologically positive uterine specimens. The uterine biopsy specimen was bacteriologically positive in one (7.1%) of 14 cattle with endocrine disturbances, in one (14.3%) of seven cattle with a chronic salpingitis, and in three (14.5%) of the 21 physically healthy cattle.

Streptococci of various types were recovered in 27 (30%) cases, micrococci of various types in 36 (40%) cases, diphtheroids in 12 (13.3%) cases, *Escherichia coli* in seven (7.8%) cases and miscellaneous organisms in 21 (23.3%) cases. The miscellaneous organisms included *Proteus sp.*, gram positive rods, gram negative rods, clostridia, and various aerobic spore formers.

A comparison of the number of bacteriologically negative animals conceiving within two heat periods after intra-uterine treatment with 50-150 cc of a 4 per cent Lugol's solution was made with a group that was observed for a six-month period in lieu of treatment. Twenty-three (79.3%) of 29 treated animals conceived within two estrual periods as compared to 38 (70.4%) of 54 untreated animals that bred during the

six-month post-examination period.

Of the 55 cases of infertility from which uterine bacteria were isolated, 44 (80%) conceived after treatment as compared with 63 (64.3%) conceptions in 98 animals which were not treated but were rechecked at the end of a six-month breeding period.

An endometritis, catarrhal or mucopurulent in type, was found as the most usual pathological condition associated with infertility. Three (60%) of five cases of catarrhal endometritis conceived after treatment by intramuscular injection of estrogenic hormones, and 36 (78.3%) of 46 cases of catarrhal endometritis bred after uterine infusion of four per cent Lugol's solution as compared to 10 (55.5%) of 18 cases which conceived without treatment. The 22 per cent difference in recovery rate between those animals treated with Lugol's solution and those which were untreated supported the conclusion that intrauterine therapy was of definite value in the treatment of catarrhal endometritis. Eighty-three per cent of the metritis cases were of the catarrhal type.

Four (57.1%) of seven cases of mucopurulent endometritis conceived after treatment by intrauterine infusion of four per cent Lugol's solution, two (100%) of two cases treated by manual enucleation of the corpus luteum later conceived, while one untreated case was still seriously affected six months later. The data were not extensive enough to draw conclusions as to whether enucleation of the corpus luteum or intrauterine infusion was preferable.

There were four cases of purulent endometritis in this series of 243 experimental animals. None conceived, although two received an intrauterine infusion of four per cent Lugol's solution, one received an injection of stilbestrol and one case was not treated.

Cervicitis was found to be the next most common cause of infertility. Only the catarrhal and the indurative and/or proliferative types were observed in this series of 243 experimental animals. Seven (64%) of 11 cases of catarrhal

cervicitis conceived after the intrauterine injection of four per cent Lugol's solution and three (100%) of three cases which received no treatment conceived during the post-examination observation period. Nine (69%) out of 13 cases of indurative and/or proliferative cervicitis conceived after the intrauterine instillation of four per cent Lugol's solution, but only six (35%) of 17 cases conceived without treatment. Two (67%) of three animals with indurative and/or proliferative cervicitis conceived after manual enucleation of the corpus luteum.

When both cervicitis and metritis were present, 13 (81.2%) of 16 cases conceived after one intrauterine treatment with four per cent Lugol's solution, while only one (16.7%) of eight untreated cases conceived.

Eleven (4.1%) cases of retained corpora lutea were observed among the animals with endocrine disorders. This number included both those that had cystic corpora lutea and those that did not have cystic corpora lutea. Five (2.1%) cases of cystic degeneration of ovarian follicles, nine (3.7%) cases of relaxation of the broad ligaments and two (0.8%) cases of delayed ovulation were also observed among the 27 (11.1%) cases thought to be infertile as the result of endocrine dysfunction.

Nine (3.7%) cases of uncomplicated bursal or bursoovarian adhesions were observed in the 243 experimental animals. One case was bilateral and eight cases were unilateral.

The freemartin condition was found in four (1.6%) infertile animals. One (0.4%) case of a didelphic uterus was observed.

One apparently normal animal remained undiagnosed, and one case each of abdominal pregnancy (0.4%), inanition (0.4%), mummified fetus (0.4%) and traumatic vulvitis and vaginitis (0.4%) were present in this series.

In an attempt to correlate the previous occurrence of re-

tained placenta or a previous abortion with the presence of uterine bacteria, it was found that 10 (63%) of 16 cases with a previously retained placenta had bacteria in the uterus and that six (50%) of 12 cases which had previously aborted had bacteriologically positive uterine biopsy specimens. Fifty-three and four-tenths per cent of the 169 cows from which biopsy specimens were taken were bacteriologically positive.

The fertility rate of the clinically normal control cows was 1.91 services per conception, with 24 (96%) of the 25 animals conceiving.

Conclusions

1. Infertility in cattle is of major importance to breeders of livestock.
2. The most frequent pathological condition associated with infertility in this survey was endometritis. The next most frequent condition was cervicitis.
3. A high proportion of the infertility observed was considered to be caused by bacteria. Micrococci, streptococci, and diphtheroids were the most common organisms recovered from the uteri of infertile animals.
4. Treatment by the intra-uterine injection of 50-150 cc of four per cent Lugol's solution were of value in shortening the period of infertility of cattle when the cause was metritis and/or cervicitis.
5. Many infertile animals became fertile spontaneously.
6. Further information is needed on all aspects of the problem of infertility in cattle.

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VITA

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